ABSTRACT

METHOD FOR REPAIRING COATED COMPONENTS

According to an embodiment of the invention, a method for repairing a coated high pressure turbine blade, which has been exposed to engine operation, to restore coated airfoil contour dimensions of the blade, is disclosed. The method comprises providing an engine run high pressure turbine blade including a base metal substrate made of a nickel-based alloy and having thereon a thermal barrier coating system. The thermal barrier coating system comprises a diffusion bond coat on the base metal substrate and a top ceramic thermal barrier coating comprising a yttria stabilized zirconia material. The top ceramic thermal barrier coating has a nominal thickness t. The method further comprises removing the thermal barrier coating system, wherein a portion of the base metal substrate also is removed, and determining the thickness of the base metal substrate removed. The portion of the base metal substrate removed has a thickness, Δt. The method also comprises reapplying the diffusion bond coat to the substrate, wherein the bond coat is reapplied to a thickness, which is about the same as applied prior to the engine operation; and reapplying the top ceramic thermal barrier coating to a nominal thickness of $t+\Delta t$, wherein Δt compensates for the portion of removed base metal substrate. Advantageously, the coated airfoil contour dimensions of the high pressure turbine blade are restored to about the coated dimensions preceding the engine run.